

Problem Set 1

Nico Hawley-Weld

1/27/24

Problem 1

Define variables $a = 1$, $b = -1$, $c = -2$ and print out the solutions to $f(x) = ax^2 + bx + c = 0$. Do not report complex solutions, only real numbers. Avoid using the variable name `c` as it is a reserved function in R. Show the code and the answer.

```
# Define function to solve for a, b, and c2
solve_quadratic <- function(a, b, c2) {
  # Calculate discriminant
  discriminant <- b^2 - 4*a*c2

  # Check if the discriminant is non-negative
  if (discriminant >= 0) {
    # Calculate the two real solutions
    x1 <- (-b + sqrt(discriminant)) / (2*a)
    x2 <- (-b - sqrt(discriminant)) / (2*a)

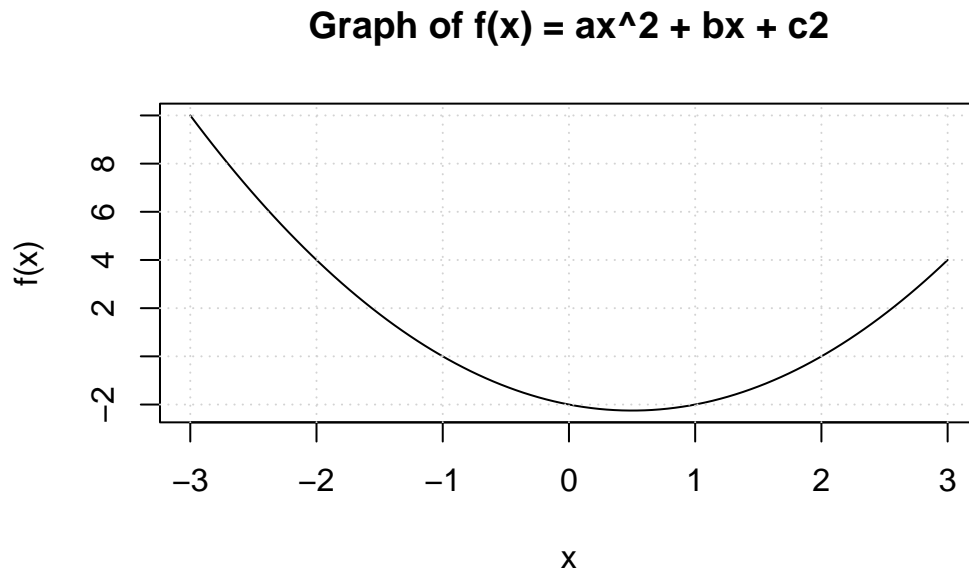
    # Print the solutions
    cat("The solutions are:", x1, "and", x2, "\n")
  } else {
    cat("There are no real solutions.\n")
  }
}

# Solve for a=1, b=-1, c=-2
solve_quadratic(1,-1,-2)
```

The solutions are: 2 and -1

Problem 2

Show a graph of $f(x)$ versus x for $x \in (-3, 3)$. Do not show the code, only the graph.



Problem 3

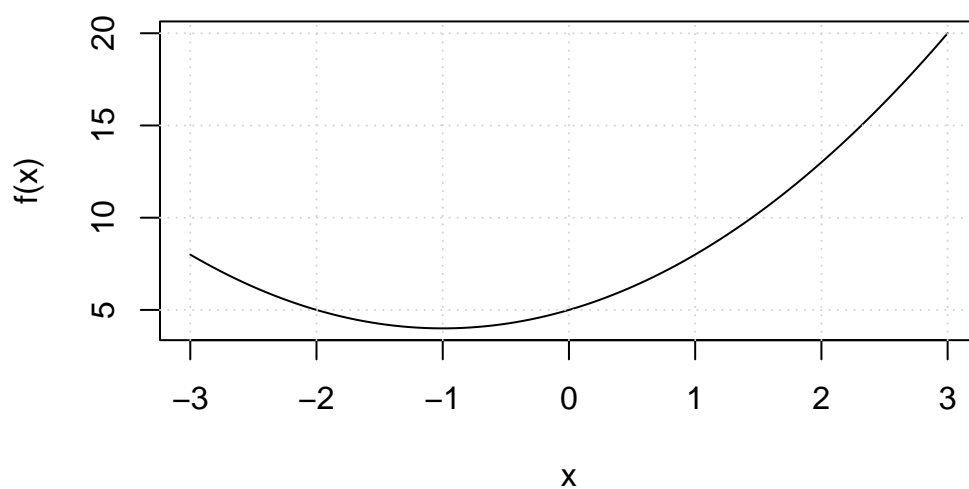
Generate a PDF report.

Problem 4

Erase the PDF report and reproduce it but this time using $a = 1$, $b = 2$, $c = 5$.

There are no real solutions.

Graph of $f(x) = ax^2 + bx + c$

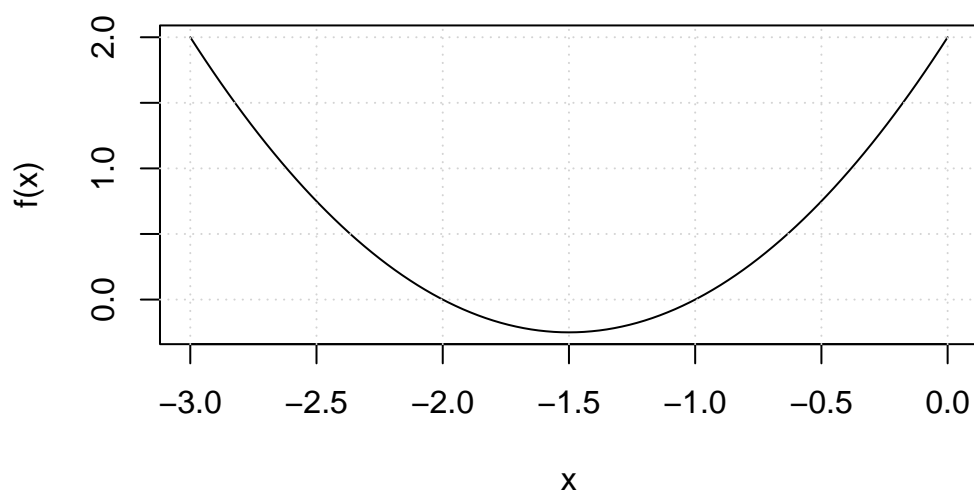


Problem 5

Erase the PDF report and reproduce it but this time using $a = 1$, $b = 3$, $c = 2$. Change the range of x to range that clearly shows the roots.

The solutions are: -1 and -2

Graph of $f(x) = ax^2 + bx + c_2$



Problem 6

Create a markdown page with the results for this last set of values, but this time showing the code.

Problem 7

Submit the markdown page, including all necessary auxiliary files, and quarto file to a GitHub repo. Make sure the markdown document renders.